Note to graders (from the test author)

Microbe Mission is a difficult event, with differing wording and some terms being interchangeable. I've tried to make the answer key as clear as possible, but here are some tips to help you in your grading.

- In general, try to be lenient.
- If the students wrote *almost* exactly what I wrote as the answer, but in a slightly different way, then give them full credit (except in a few places on the answer key where I mention a specifically *incorrect* answer, but those will be clearly marked on the answer key).
- If they made a *small* spelling mistake, but the answer is still clearly recognizable, then give them full credit.
- In some cases, more than one answer is acceptable. In this case, I put "OR" between acceptable answers. For example, if the question is "Name 1 US state that does not border any other state" then the answer on my answer key would be "Alaska OR Hawaii".
- Questions are worth one point each, unless otherwise noted. This includes questions with letters in them; for example 39a is worth one point, 39b is worth one point, 39c, and 39d as well, so question 39 is worth 4 points in total.
- Students do *not* need a calculator or a ruler, but they may be given one.
- It is recommended that you give students at least 50 minutes for this test, although up to 60 minutes would work just as well. I do not recommend testing in less than 45 minutes. If you wish to shorten the test, you are advised to remove section 6 in its entirety, as that is a more general section and all of the topics will still be covered evenly with its removal.

Microbe Mission Answer Packet

Name: Answer Key **Score:** ___/131

Section 1

1. **Ocular OR Eyepiece**
2. **Tube OR Body Tube**
3. **Turret OR Revolving Nosepiece**
4. **Objective OR Objective Lens**
5. **Stage**

½ point per correct microscope, ½ point per correct specimen:

6. Microscope: **E**
   Specimen: **L**
7. Microscope: **D**
   Specimen: **N**
8. Microscope: **E**
   Specimen: **K**
9. Microscope: **B**
   Specimen: **O**
10. Microscope: **A**
    Specimen: **I**
11. Microscope: **F**
    Specimen: **J**

12. **A**
13. **C**
14. **A**
15. **C**

16. **200x**
17. **0.45mm OR 450um**

Section 2

18. **E**
19. **B**
20. **F**
21. **E**
22. **A**
23. **B**
24. **F**
25. **C**
26. **B**

27. **Vibrio Cholerae**
28. **Helicobacter Pylori**
29. **Ebola**
30. **Tapeworm**
31. **Naegleria OR Naegleria Fowleri**

32. **B, C, D, A (In <u>that</u> order)**
33. **Mosquito**
34. **Thrush OR Candidiasis**
35. **Kuru**
36. **Rubella OR Mumps OR Chicken Pox OR Varicella**

37. **B**
38. **F**

Tiebreakers

Tiebreaker #1. **Siedentopf OR Compensation-Free**

Tiebreaker #2. **C** *(Note: new studies prove this)*

Tiebreaker #3. **A**

Tiebreaker #4. **The joke is that the common name for tardigrade is "water bear"**

Tiebreaker #5. **14 hours**

Tiebreaker #6. **E**

Section 2 (continued)

39a. (1 point) **Pork OR Wild Boar**

39b. (1 point) **Periorbital Edema OR Swelling of the face/eyes**

39c. (1 point) **Cook meat thoroughly OR Avoid eating Pork or carnivorous game meat**

39d. (1 point) **Albendazole OR Mebendazole**

40a. (1 point) **β-Lactam OR Beta-Lactam**

40b. Any **TWO** of the following (½ point each): **Red skin, swollen skin, warm/hot skin, fever, oozing pus, boils, abscesses, cellulitis, necrotizing fasciitis, sepsis/blood poisoning, gangrene**

40c. (½ point each): **Natural selection, "Horizontal gene transfer"/conjugation**

40d. (½ point each): **Healthcare Associated, Livestock Associated**

40e. (1 point) **Because it promotes the development and spread of antibiotic resistant bacterial strains.**

41. **"A, B, C, D, E" (in <u>any</u> order)**

42a. (½ point) **Ammonia/Ammonium (NH3/NH4+)**

42b. (½ point) **Nitrate (NO3)**

43. **E**

44. **Lactobacillus**

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Name: **Answer Key**

Section 3

45.**D** 46.**B** 47.**A** 48.**F**
49.**G** 50.**C** 51.**E**

52.**A AND B (in any order)**
53.**A** 54.**E** 55.**D**
56.**Cyanobacteria OR Blue-Green Algae** (Note: Just putting "algae" or "bacteria" receives no points)
57. **D, C, E, B, A (in that order)**

58a.(1 point)**Peptidoglycan**
58b.(1 point) **A AND B (in any order)**
59a.(1 point)**Peritrichous**
59b.(1 point)**Monotrichous**
60.**A**

61.**D** 62.**C** 63.**H**
64.**F** 65.**B**

66.**C** 67.**D** 68.**D**

69.**Capsid OR Head**
70.**Sheath**
71.**Bacteria**

72.**A**
73.**Protista**
74.**D**
75.**A, B, D (in any order)**
76.**F**
77.**B AND C (in any order)**
78.**C**
79.**Prion**

80.**Definition**(1 point)**: the head (anterior) region of a tapeworm (**Note: they must specifically say tapeworm)**. Two parts:** (1 point each) **Any TWO of the following: Suckers/bothria** (suckers and bothria are the same thing)**, Hooks, Rostellum**

Section 4

81.**Lag Phase** 82.**Growth OR Exponential Growth OR Log Phase**
83.**Stationary Phase** 84.**Death OR Decline Phase** 85.**B** 86.**C**
87.Accept any answer between **-5 and 4**
88.Accept any answer between **32 and 45**
89.Accept any answer between **3 and 33**

90.**The virions/viruses are entering the host cells.** 91.**C**

Section 5

92.**Bacteria** 93a.(1 point) **Iodine OR Gram's iodine**
93b.(1 point) **"To act as a mordant" OR "To bind to Crystal Violet" OR "To keep the Crystal Violet inside of the cell"**
94a.(1 point) **It shrinks/tightens the peptidoglycan layer.**
94b.(1 point) **Acetone**
95a.(1 point) **Safranin OR "Basic Red 2"** 95b.**C** (1 point) *(Note: Gram+ retain it, but the color of CV dominates over the color of safranin)*
96a.(1 point) **Bacteria must become fixed/attached to the slide**
96b.**B** (1 point) 97.**A** 98.**B** 99.**D**
100.**Cotton ball/swab OR inoculation loop OR toothpick** 101.**D**
102.**C**
103.(2 points)**800,000 CFU/mL** 104.(2 points)**Dilute the sample OR perform a serial dilution**

Section 6

105.**Reducing agent OR Electron donor OR "Donates an electron"**
106.**Water**

107.**1 point for saying that the plasmid coded for resistance to ampicillin, 1 point for specifically saying that it coded for "Beta Lactamase" OR "β-Lactamase"** 2 points in total.

108.3 points in total: **1 point for stating that the medium where the satellite colonies grow contains lower levels of ampicillin** (not none, just lower levels)**, 1 point for stating that the transformed colonies** (not the satellite colonies) **produce β-Lactamase/Beta-Lactamase, 1 point for specifically saying that the Beta-Lactamase diffuses into the medium surrounding the transformed colonies ANd causes the ampicillin there to break down.**

109.**Tetracyclin** 110.**Penicillin** 111.**D**